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Automatic Trawling System For Fisherman

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Abstract: Fishing in India and all over the world is a major industry in its coastal states, employing more than 14 million people. It is one of the hazardous occupations with many problems such as high operational cost, lack of landing facilities, scarcity and availability of kerosene, less price for fish, lack of transport facility, technological change etc. The techniques for catching fish include hand gathering, spearing, netting and trapping, all this is done manually. To reduce human intervention in fishing we came up with our idea of “ Automatic Trawling System For Fisherman”. This device will replace the ordinary method of catching fish mainly reducing human workload and risk caused by this. The device is a structure with a carrier attached beneath and goes deep into the ocean to recognize different types of fish and traps them in a special carrier. It automatically records the path by different technology, where it could find more fish. This predetermined data is used for catching fish every day.

INTRODUCTION

Fishing is one of the oldest and most essential occupations worldwide, providing sustenance and livelihood to millions. Traditional trawling methods, however, are labor-intensive, time-consuming, and often inefficient. Fishermen face numerous challenges at sea, including unpredictable weather, physical strain, and the need to manually operate and monitor equipment for long hours. To address these issues, technological advancements in automation and smart systems are being increasingly applied to the fishing industry.

The **Automatic Trawling System** aims to modernize traditional fishing practices by integrating automation, sensors, and real-time control systems into the trawling process. This system is designed to reduce manual labor, increase efficiency, and enhance the safety and productivity of fishing operations. By automating tasks such as net deployment, depth control, and fish detection, fishermen can focus more on strategic decision-making and less on physically demanding operations.

This project explores the design, components, and working of an Automatic Trawling System, highlighting how it can revolutionize small-scale and commercial fishing, ensuring higher yields with minimal environmental impact and human effort.

Fishing may be a prehistoric practice dating back a minimum of 40,000 years. Techniques for catching fish include hand gathering, netting and trapping. Consistent with Food and Agricultural Organization (FAO) statistics, the entire number of fishermen and fish farmers is estimated to be quite 38 million [Brandt1964]. Fisheries and aquaculture department provides employment to over 500 million people. Fishing sector provides about 20-30 kcal per capita per day. Fishing is the process of catching fish from water bodies for commercial profit. Many of us working in commercial fishing are self-employed, with some or their entire pay hooked in to the proceeds from the sale of the fish caught.

Design Methodology

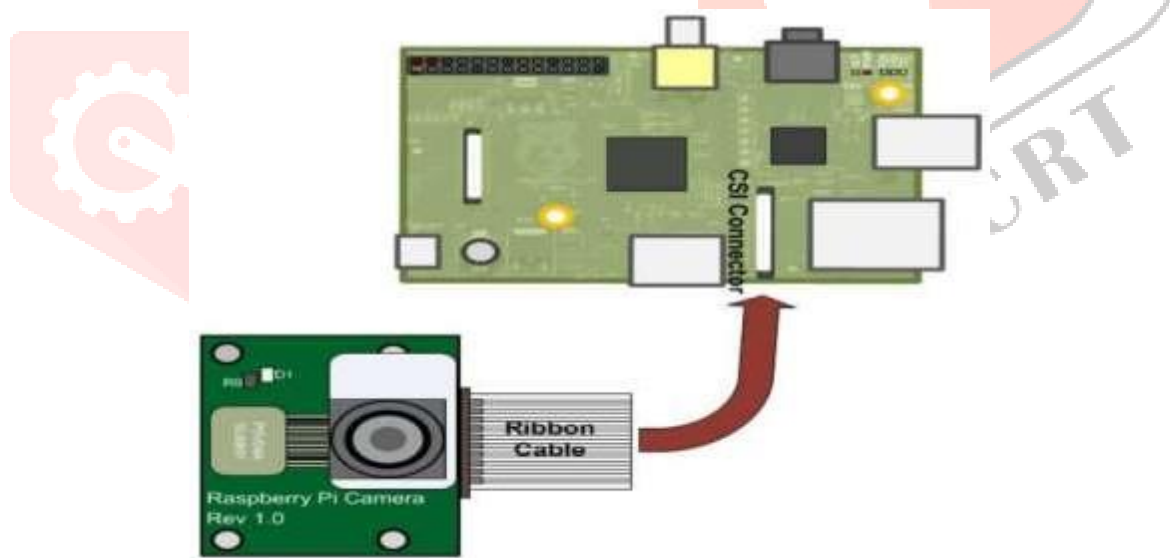
The device is a boat-like structure with a carrier attached beneath it for carrying the fish. The carrier is structured in such a way that it allows only the entry of fish. Once the fish gets trapped in the carrier it can't be escaped. The device will go into the ocean and recognize different types of fish by underwater image processing and trap them in the carrier. We are not assigning a predetermined path for the device. It automatically records the path and the place where it could find more fish. It uses this predetermined data for catching fish every day. Through machine learning, the device will find a better path for its navigation and find places where there is more probability of fish and record this data. Through the GPS inside the device, the operator can locate the exact location of the device.

Hardware Requirements

The main components required for the construction of a automatic fishing machine are:

- (i) Arduino Uno Rev3 : The board which can be interfaced with the camera module.
- (ii) Camera V2: Camera it does the same job of capturing pictures and videos.
- (iii) Gear Motors: Which throughout drives the device.
- (iv) Carrier unit: The device having an external part where it can collect fish.
- (v) Net: it is use to catch the fish.

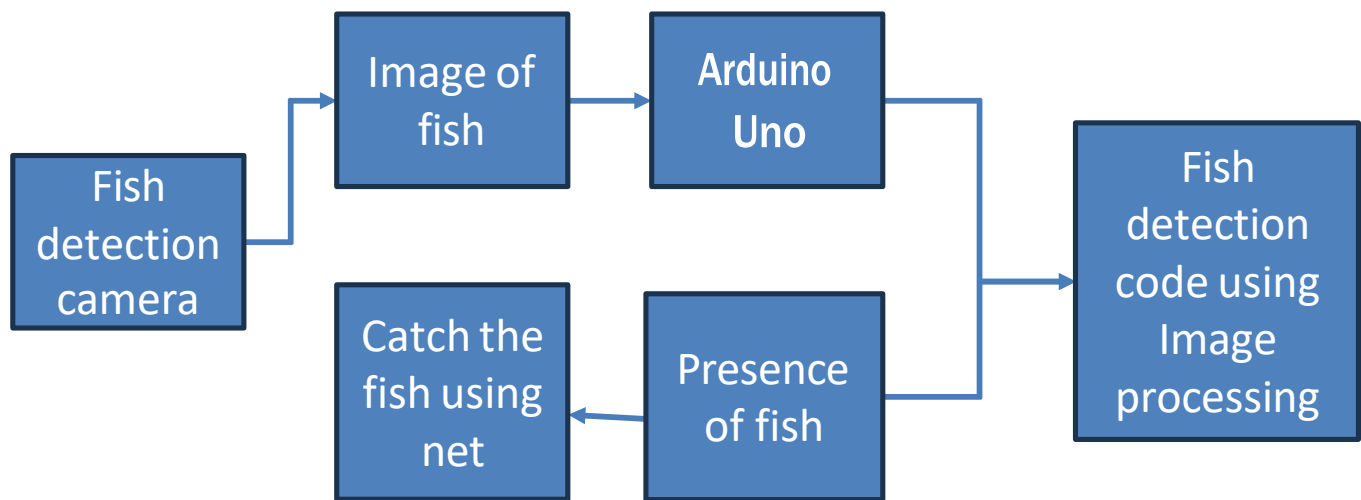
Interface of the Arduino



Software Requirements - Image Processing

With the help of underwater cameras, images of fish are captured and caught. The algorithm used for image processing is point mapping [Schulmann1997]. The image of fish and cluttered scenes from the ocean is compared to detect the presence of fish. In figure 3, images of a fish and cluttered scene are taken. Using point mapping algorithms, in figure 4 the strongest feature points from the images were marked. In figure 5 points were matched including outliers and in figure 6 only interior points were matched. Figure 7 shows the detected fish in a rectangular box.

(2.3)



Block Diagram

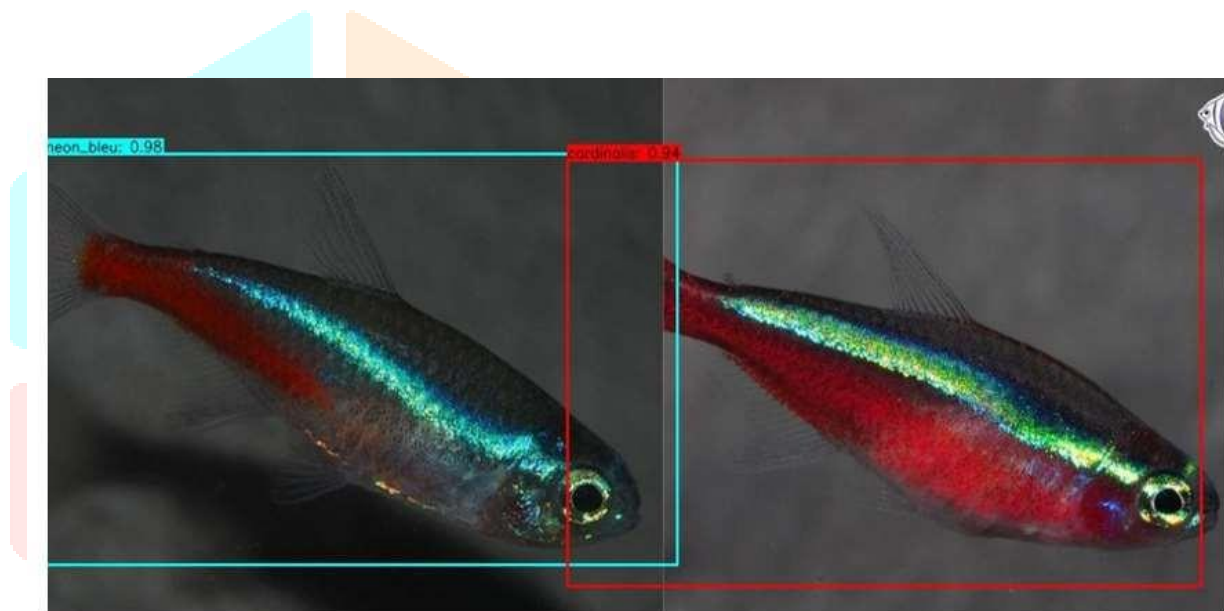


Fig: Fish Detection Using Camera

CONCLUSION

In this paper, we have presented a “AUTOMATIC TRAWLING SYSTEM FOR FISHERMANS” which is capable of replacing the ordinary method of catching fish mainly reducing human workload. Fishing is one of the hazardous occupations with many problems such as high risk in human life, high operational cost, scarcity of fuel, lack of quality fish, technological changes and so on. Several fishermen lost their lives due to unexpected disasters. These can be completely avoided by using this device. This device will aid the fishing industry with new technologies. In this paper we use point mapping algorithm for identification of fish using image processing and obtained final result accurately by this. By our conclusion identification of fish by image processing can be accurately done by using convolution codes. Image processing by capturing pictures of fish as well as capturing video can make accurate fish identification. The machine can be trained by Machine learning with proper algorithms and make our device fully automatic.

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